

NOTES ON AUSTRALIAN DIPTERA, No. xiv.

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In connection with the presentation of this series of papers I may at this time be permitted to make a brief statement.

The work was originally undertaken at the request of the late Dr. Eustace W. Ferguson, and was intended as an aid to him in his biological work in Australia. With the passage of time, however, the scope of the project was broadened to include practically all the Cyclorrhapha except the Syrphidae and some related families. The amount of time which I can devote to Australian Diptera is but small, being but a fraction of my leisure time and no portion of my official time is given to them. As my leisure time only can be devoted to systematic work on Diptera, and my studies on the latter include those on material from all over the world, and that time is further cut into by work upon Hemiptera and Hymenoptera, it can be seen that papers on Australian Diptera must form but a minor part of my output on systematic entomology, and that they can under the present circumstances not be monographic, and certainly not so thorough as I would like them to be. In addition to lack of time, one must also consider the paucity of material and lack of field knowledge of same.

I have thus been compelled to adopt a quite conservative course and it is but seldom that I have ventured to present data upon families other than those I have had a good representation of, even when such data might be used in the classification of Australian forms, unless I considered it absolutely necessary that such data, usually previously unpublished, should be made available to Australian students of Diptera. One case in point is to be found in the remarks on the family Asilidae presented herein. The literature on Diptera is increasing very rapidly and many of the old works are both rare and expensive while some of the more important papers on the order appear in magazines or other publications that are not readily procurable in Australia. Consequently many students find it impossible to consult important papers dealing with the groups in which they are interested, and frequently lacking a knowledge of extralimital forms formulate schemes of classification which are not tenable when the world's fauna is considered. This statement applies equally well, of course, to students similarly situated in any part of the world.

My own knowledge of Diptera is not as extensive as I would have it, but my facilities for study of material, and the available library facilities, are greater than they are with most students so I have presumed to express in a few cases ideas that appear to me to be worth consideration in attempting to classify Australian flies.

It is not to be assumed that the genera of many families are better known in South America, Africa, or the Orient, than they are in Australia, and though I

have before me a published paper which on the face of it presents a comparative list of the Brachycera of Australia and other faunal regions, I venture to suggest that the day is still far distant when such a presentation can rest upon anything but a very unstable basis.

Family Asilidae.

By far the greatest amount of work on Asilid genera has been done by Loew, and the present classification of the family rests largely upon his work which was published in the first two decades of the last half of the nineteenth century. Therefore, if one desires to understand the system in use today, a knowledge of these earlier papers is imperative. But Loew's knowledge of Diptera, extensive as it was, did not include an appreciation of many of the characters recently introduced for the differentiation of genera, and his distinctions are largely based upon the structure of the antennae, head, legs, and wings, with some attention being given to the chaetotaxy of the thorax, and the structure of the genital organs of both sexes.

More recent workers have introduced other characters, and in America the major grouping is based upon the structure of the palpi, whether one-segmented or two-segmented, while just recently in Australia a suggestion has been made to place more importance upon the presence or absence of genital spines in the females than ever Loew cared to suggest. In fact this latter character has been refused recognition as of even subgeneric value by one recent worker in North America.

Unquestionably all of these characters have a greater or less value as indices to relationships, but the use of any one of them exclusively as a distinctive criterion will not produce a perfect classification. I do not believe, of course, that an absolutely perfect classification is attainable, but the application of the standards referred to results in some incongruous assignments of genera which may possibly be avoided, I think, by accepting other characters as criteria for group purposes.

The palpi are not invariably segmented in accordance with the assignments of Williston in North America, and I find that in many cases the student attempting to make use of the character would be in doubt whether to consider the raised base or pedicel of the palp as a segment or not. The aristaе are so various that any attempt to segregate subfamilies on the basis of their structure is impossible because of the exceptions to any rule adopted. The venation of the wings is also quite variable, and any cell that may be accepted as a criterion may be closed or open in any of the subfamilies. The presence of genital spines in the female is a character that may be associated with the method of oviposition of the species having them, but apart from being applicable to but one sex, and therefore not a commendable character to use for generic purposes unless a co-ordinated character is present in the male, adaptive characters due to habits or habitats are not reliable as indices to relationships, so many parallelisms occurring in all groups. It is noteworthy that in the Muscid genus *Hylemyia* Robineau-Desvoidy there are a few species which have similar genital spines and, so far as I know, these species deposit their eggs at the bases of cereal plants, such as wheat. Those species have not been separated generically from the normal species of *Hylemyia* which lack genital spines, some of which species have similar egg-laying habits to those that possess spines. There are also other Muscid genera in which either all or a part of the species have genital spines in the female but nothing is known of their methods of oviposition.

In connection with the subdivision of the old genus *Asilus* Linné, in which the genital spines have been used to some extent as distinguishing characters, it may be well to mention that American authors have disregarded Loew's genera, though some European authors attempt to make use of them. One result of trying to segregate both European and American species of *Asilus*, *sens. lat.*, in accordance with Loew's concepts, is that a number of additional genera, or subgenera, would have to be erected for the reception of species which do not fall readily into any of the genera proposed by Loew. An examination of his work shows that originally he proposed the named segregates of *Asilus* as subgenera, but later, in his paper on African Diptera (1860), he presented a key to the group and gave them full generic rank. As one of the major groupings is based upon the genital structure of the females, and quite a few of the genera are distinguished merely by colour characters, the scheme can hardly commend itself to anyone who desires generic distinctions to consist of structural characters segregating groups and applicable to both sexes, which incidentally in my opinion is the only method to pursue if one intends to attain any degree of permanency for the system, and especially if one hopes that it will be generally adopted.

Subfamily LAPHRINAE.

Genus ATOMOSIA Macquart.

This genus is listed as occurring in Australia and, judging from the characters given by Miss Ricardo in her key to the genera of Laphrinae, the species placed here by her ought to run very close to the genus if not actually belonging here. I have no species of the genus from Australia, but have one before me which can be placed in neither that genus nor *Aphestia*, though it most closely resembles the former, and in some respects also is very similar to *Laphystia* Lcew, or at least the North American species placed therein. I have carefully examined the genotype of *Atomosia* and compared it with the Australian species and this comparison shows that though the two species are superficially similar there are a number of quite important characters in which they differ. The marginal (ambient) vein of wing is discontinued at the apex of fourth branch of media in *Atomosia*, the margin from there to base of wing, including alula, lacking a distinct vein, the alula is quite poorly developed, and the second branch of radius connects with first well before apex of latter, the cell between the costa and first branch being rather wide to tip. In addition to these venational characters the metanotum has on each side a group of hairs mixed with bristles, and there are deep punctures on dorsum of thorax, part of pleura, and dorsum of abdomen.

The Australian species agrees with *Atomosia* and *Laphystia* in having the prosternum all in one piece, uniformly chitinous, and connecting with the dorsal portion of the prothorax, forming thus a continuous collar, as distinguished from the structure of the prosternum in *Deromyia* Phillippi, and most other genera, in which there is a well defined central chitinous plate separated by a membranous, or submembranous, section of variable width on each side from the upper chitinous portions. This complete prosternum is present in all the genera of the subfamily Laphriinae seen by me, and might prove of more significance as a distinguishing character than the single venational character now in use for separating the subfamily from Dasygogoninae. The occurrence of the complete prosternum in a few genera now placed in the latter group may indicate that these are wrongly placed, but further investigation of the matter is desirable

before a definite decision can be expected. The genera referred to are *Lasiopogon* Loew, *Holcocephala* Jaenicke, and *Stichopogon* Loew. The same character occurs in Leptogastrinae.

It may appear strange that except for a very recent reference by Ricardo, the discontinuance of the marginal vein has not been noted in this group, as the continuous marginal or ambient vein is generally accepted as one of the outstanding group characters, but nevertheless it is lacking, as above noted, in *Atomosia* and in *Cerotainia* Schiner, or at least in the North American species placed in the genus, and in *Laphystia* Loew from the same region it is lacking on the alula, and from the anal angle to the apex of anal cell, and present on outer side of the cleft between the anal angle and alula. The alula in the last-mentioned species is quite large and a little pointed at outer lower angle as distinguished from the regularly rounded form in most genera. In the Australian species before me the ambient vein is complete, distinct even on alula, and the second branch of radius connects with costa rather than with first branch of radius, but I expect there may be some variation in this last character as is the case in *Laphystia* which it closely resembles in this respect. I note here that the genus *Triclis* Loew, or at least the American species placed in the genus, has the marginal vein complete and if this holds for the genotype it is distinct from *Laphystia* and not a synonym as stated by some authors. There are no metanotal hairs in *Laphystia* nor in the Australian species.

The latter has the third antennal segment hardly longer than the first two combined, and the abdomen is not distinctly punctate; it can not be referred to *Atomosia* for the reasons stated above, and it can hardly be placed in *Aphestia* Schiner because of the much shorter antennae. Whether it belongs to some described genus or not I am unable to say at this time.

Genus NUSA Walker.

This genus has but recently been elucidated by Ricardo, and *Dasythrix* Loew has been sunk as a synonym of it by that author. It was erroneously recorded as occurring in Australia, the present distribution confining it to Africa and the Orient. In this genus we find a recurrence of the incomplete ambient vein as in the genera discussed under *Atomosia*, but the first and fourth posterior cells of wing are closed, and the apices of the branches of media are evanescent, being hardly traceable to margin of wing. None of the genera above referred to agrees with it in those characters. The species previously recorded as belonging here is now removed to *Andrenosoma* Rondani.

Genus LAPHRIA Meigen.

This genus is based upon a European species which I do not have access to at present, and if published records are dependable it is cosmopolitan. Here again we find a complete prosternum, and in the North American species there are two groups, one with hairs on each side of the metanotum, and the other without hairs. I consider these groups are entitled at most to subgeneric distinction. All the large stout hairy species in North America usually placed in the genus *Dasyllis* Loew have the hairs present, as do most of the species of slender build which have the dorsum of abdomen densely haired, the smaller slender species which have fewer hairs on the dorsum of abdomen lack the hairs, as does also *gilva* Linné.

Genus *ANDRENOSOMA* Rondani.

This genus differs from the preceding one in having the first posterior cell of wing closed, and the male hypopygium with the forceps extending beyond the basal lateral arms as a rule, the forceps of *Laphria* species usually being more or less hidden between the lateral arms. One species from Mexico (*formidolosa* Walker) and another from British Guiana (*pyrrhopyga* Weidemann) evidently belong here. Both of these species have the metanotum haired on each side. The Australian species *tectamus* Walker is evidently congeneric though in it the metanotum is bare. These two groups are similar to the two in *Laphria* above referred to and may constitute distinct subgenera.

Genus *MAIRA* Schiner.

Another genus very similar to *Laphria*, but the face is less prominent below, and the metanotum is bare. I have seen the genotype and one or two other species that I consider belong here, one from New Guinea in the United States National Museum being named *aenea* Fabricius by Coquillett.

Subfamily *DASYPOGONINAE*.

This subfamily is more extensive than Laphrinae and presents a more diverse habitus in its constituent genera. The usual method of separation is by means of the wing venation, the marginal cell being given as closed invariably in Laphrinae, and open, or but rarely closed, in Dasyponinae. However, as already indicated, there are variations in the venation which preclude it being adopted as an invariable index to subfamily segregations. I do not purpose to go farther in defining the two groups than I have already gone in indicating the complete and incomplete prosterna as possible indices to the divisions, and below offer merely some notes on genera which either occur, or are reputed to occur, in Australia. The data presented are drawn from material in the United States National Museum collection of Australian species, which is not at all comprehensive, and from my own collection.

Genus *DEROMYIA* Phillippi.

This genus has been recorded from Australia. I have not seen an Australian species of the genus, but have before me the genotype, *gracilis* Phillippi, from Chile, lent me by the United States National Museum.

A number of years ago Williston published the statement that *Diogmites* Loew is synonymous with *Deromyia*, and Osten-Sacken objected to that opinion, asserting that they were at least entitled to subgeneric separation. However, most recent workers have accepted Williston's dictum, and the North American species congeneric with *Diogmites platyptera* Loew have all been considered as belonging to *Deromyia*.

It appears to me, after a careful examination of the genotypes, that *Deromyia* is not congeneric with *Diogmites* for the following reasons: The ocellar region has on it in *Deromyia* a few microscopic hairs only, while in *Diogmites* there are two very strong bristles; the fore tibial spur in *Deromyia* is blunt at apex and is opposed to a short ridge or wedge-shaped elevation on basal portion of the ventral surface of fore metatarsus, while in *Diogmites* the spur is sharp at tip and rests in a depression surrounded in part by a number of short stout spines; the basal two antennal segments in *Deromyia* are subequal in length, while in *Diogmites* the basal one is much shorter than the second, and in the former the

third segment has a few fine hairs above at, or just beyond, middle while in *Diogmites* there are hairs on almost the entire basal half of upper surface. It is also worth noting that the apex of fourth posterior cell is truncate in *Diogmites*, with the vein closing it as long as the cross-vein above it, while in *Deromyia* the cell is pointed at apex, with the vein closing it at least twice as long as the cross-vein above it.

From the above data one may be able to determine if the genus *Deromyia* occurs in Australia.

Genus SAROPOGON Loew.

I have not any species of this genus from Europe and lack the genotype, so my deductions are based upon an examination of North American species placed in the genus by previous workers.

The American representatives of this genus are rather similar to *Diogmites*, differing essentially in having the fourth posterior cell almost invariably open, and in having from six to ten quite strong ocellar bristles. The part of ventral surface of basal segment of fore tarsus opposed to the tibial spine is usually raised, tuberculate, but not so much so as in *Blepharepium* Rondani. In the latter, which is closely allied to this genus and *Diogmites*, the fourth posterior cell is closed and the ocellar region has only short hairs, while the pulvilli are not more than half as long as the claws, being much shorter than in the other genera.

The species of New Zealand Asilidae placed by Hutton in *Saropogon* that are in my collection now do not agree with the North American forms, having the ocellar region without well developed bristles, and the third antennal segment without hairs above on basal half. These hairs are possessed by all four American genera mentioned in this and the preceding discussion of species.

Genus CHRYSOPOGON Roeder.

This genus is readily distinguished from its relatives by the strong spine situated on a short elevation on each side of mesonotum just above base of wing. I have seen only *albopunctatus* Macquart.

Genus NEOSAROPOGON Ricardo.

I believe no genotype has been designated for this genus, so name *princeps* Macquart, the first included species.

It is possible that with the accession of more material I may be able to present some more notes on this family at some future date. The foregoing may, however, prove of some small value to those interested in a group which presents interesting features both in taxonomy and biology.

The succeeding part of this paper is devoted mainly to descriptions of new species and to completing work already partly done in previous papers of the series. It has been my intention to present synoptic treatments of all groups dealt with as the work progressed as I have no guarantee that I may be able to continue the series and consider that such synopses are essential to others should I cease now.

Family Chloropidae.

Subfamily BOTANOBIINAE.

In part xiii of this series of papers I presented a key to the genera of this subfamily, but did not include a key to the species of the following genus.

Genus PARAHIPPELATES Becker.

Since the publication of my key to the species of *Parahippelates* in the first paper of this series (These PROCEEDINGS, xlviii, 1923, 620) I have described some additional species of the genus in part iii (Id., xlix, 1924, 329-331) and in part vi (Id., I, 1925, 96). It thus appears necessary to publish a new synopsis of the species, which is presented below.

One of the species is made the basis of a new subgenus, and possibly it might be accorded full generic rank, but the segregation of a single species does not appear advisable at this time. Should more species occur in which the mesopleura is hairy, full generic status might be accorded the group, as the presence of mesopleural hairs is quite exceptional in this family.

Key to the Species.

1. Wing with a large well defined black mark either in centre or on costa 2
Wing without a well defined black mark, at most with a brownish costal suffusion 3
2. Wing with a large black patch in middle, covering about one-third of its area; arista practically nude, not twice as long as third antennal segment; femora largely black; length, 3.5 mm. *ornatipennis* Malloch
Wing with a large black mark on costa which extends from a little beyond apex of first vein to just beyond apex of second, but not behind third vein on disc; arista with short hairs, its length about three times that of third antennal segment *costomaculata* Malloch
3. Arista white, with dense short white hairs; femora and tibiae largely or entirely fuscous; halteres fuscous brown; wings hyaline, last section of fourth vein more than twice as long as preceding section; thorax dark fulvous, with distinct, but not dense, pale dusting *albiseta* Malloch
Arista and its hairs dark, not white 4
4. Costa of wing rather noticeably browned from apex of first vein to apex of fourth; dorsum of thorax fulvous yellow, very distinctly shining, with very faint dusting; third antennal segment largely brown; longest hairs on arista about as long as its basal diameter *brunneicosta* Malloch
Wings without evident costal clouding 5
5. Arista densely short haired, the longest hairs distinctly longer than its basal diameter 6
Arista almost bare, at most with pubescence which is not as long as its basal diameter 7
6. Pleura and lateral margins of mesonotum rufous yellow, sternopleura black below; mesonotum not shining, and without distinct vittae; outer cross-vein at almost twice its own length from apex of fifth *duplicata* Malloch
Thorax black, propleura rufous yellow, mesonotum shining, distinctly vittate; outer cross-vein at a little more than its own length from apex of fifth vein
..... *aequalis* Becker
7. Hind tibial spur straight, very small and fine, and not nearly as long as tibial diameter, sometimes even indistinguishable 8
Hind tibial spur curved, and stout, at least as long as tibial diameter 10
8. Mesopleura with fine pale hairs on entire surface; disc of scutellum with fine dark hairs and some on sides below level of the bristles; upper extremity of outer cross-vein nearer base of wing than lower, i.e. the outer cross-vein sloped towards base of wing from lower to upper extremity
..... (Subgenus *Terraeregina*, nov.) *dasypleura*, n. sp.
Mesopleura bare; scutellum with a few stiff hairs or setulae on disc; outer cross-vein sloped outward from lower to upper extremity 9
9. Legs testaceous yellow, only the apical two tarsal segments of mid and hind legs slightly darkened; fifth visible tergite and hypopygium of male yellow, the former with several rather fine long black downwardly directed bristles on its sides; thorax with the dorsum evenly and densely coated with grey dust, a line drawn in continuation of outer cross-vein to costa would pass through second vein close to its middle *seticauda*, n. sp.

- Legs with at least the hind femora and tibiae largely fuscous; dorsum of thorax glossy purplish-black, with quite faint dust centrally, most distinct on two narrow submedian vittae; a line drawn in continuation of outer cross-vein would strike costa close to, or even slightly beyond, apex of second vein
10. Eye distinctly higher than long, and about three times as high as cheek; small species, about 2.75 mm. in length: all femora broadly infuscated at middle in female *anomala* Malloch
 Eye distinctly longer than high, and not twice as high as cheek; larger species, more than 3.5 mm. in length 11
11. Femora entirely tawny yellow, or very faintly darkened in middle .. *nudiseta* Becker
 Femora blackened except at apices and, very narrowly, at bases .. *fuscipes* Malloch
N.B.—I believe that I have two additional species before me, one from Sydney, N.S.W., the other from Blue Mts., but there are only single specimens of each available, so I am leaving them aside pending the receipt of more material.

PARAHIPPELATES SETICAUDA, n. sp.

Male and female.—Head bright lemon-yellow in male, duller yellow in female, frons above, including the upper portion of the triangle, and the occiput except its lower third, fuscous, and grey dusted, antennae and palpi yellow; arista fuscous, basal two segments yellow; all hairs and bristles generally black in female, only those on frons black in male. Thorax black, slightly shining on dorsum, densely grey dusted, without dorsal vittae; a few pale hairs on mesosternum. Abdomen of male dark brown, with the apices narrowly, and incurved lateral portions of visible tergites 1 to 4 broadly, and all of tergite 5, yellow, in the female the tergites are dark brown, with narrow apical yellow margins. Legs yellow, paler in male, apices of tarsi slightly browned. Wings hyaline. Halteres yellow.

Frons at vertex about one-half the head width, and about as wide as long, not noticeably narrowed in front, triangle extending about three-fourths of the way to anterior margin; eye about 1.25 times as high as long, vertical, and about three times as high as cheek, rather less in female; arista subnude. Thorax with the dorsocentral bristles quite well developed, the acrostichals very weak, and one bristle on anterior margin mesad of each humerus; pleura bare, even the sternopleural bristle normally lacking; basal scutellar bristles half as long as apical pair, the discal hairs weak. Fifth visible tergite of male with quite long downward-directed black bristles on margin. Hind tibial spur indistinguishable. Ultimate section of fifth vein subequal to penultimate section of fourth.

Length, 2.25-2.75 mm.

Type, male, Sydney, N.S.W., 25.1.1925; allotype and four paratypes, same locality, 26.11.1924; one female, Warburton, Vict., 13.1.1924 (F. E. Wilson). The Sydney specimens were taken by Dr. E. W. Ferguson.

PARAHIPPELATES PARVA, n. sp.

Female.—Head clay-yellow, frons brownish above, triangle fuscous and grey dusted, upper occiput coloured as triangle; third antennal segment brown above; palpi yellow; inner mouth margin not darkened. Thorax fuscous to black, dorsum slightly shining, evenly and rather densely grey dusted, the vittae very faintly indicated. Abdomen coloured as thorax, more evidently shining, and less dusted. Legs pale testaceous yellow, all femora broadly infuscated in middle; apical two tarsal segments of hind legs very slightly darker than basal three. Wings hyaline. Halteres yellow. Hairs on coxae, sternopleura, and part of fore femora, white, elsewhere dark.

Frons at vertex more than half the head width, and wider than long, narrowed to anterior margin, triangle broad, extending beyond middle of frons; lateral

setulae long; arista with distinct pubescence; eye about 1.25 times as high as long, and about three times as high as cheek. Thorax with the dorsocentrals weak except posterior pair, the acrostichals fine and short, sometimes one or two pairs rather long; scutellum with the basal bristles shorter than apical pair, and the two discal hairs weak. Hind tibial spur black, curved, close to apex, and about as long as the tibial diameter. Ultimate section of fifth vein subequal to penultimate section of fourth, the latter about one-third as long as its ultimate section.

Length, 2.5-2.75 mm.

Type, Sydney, N.S.W., 29.12.1923; paratypes, same locality, 29.1.1925, and 1.2.1925.

The two species of which I am uncertain are closely related to the above, and are about the same length.

PARAHIPPELATES (TERRAEREGINIA) DASYPLEURA, n. subgen. et sp.

This species is placed in a separate subgenus, of which it is the only known species, on the character of the finely haired mesopleura. The dorsocentral bristles are very short and fine except the posterior pair, the acrostichals are represented by microscopic hairs, the scutellum is thicker than in typical *Parahippelates*. It has many microscopic hairs on the disc and on sides, and the basal bristles are placed higher than in the other group. The backward inclination of the outer cross-vein of wing is very pronounced. I do not cite any but the haired mesopleura as a subgeneric character.

Female.—Head testaceous, anterior margin of frons more orange-yellow, upper portion of frons, including triangle, brownish-black, shining, distinctly grey dusted, anterior portion of frons, face, and cheeks anteriorly, yellowish-white dusted, posterior portion of cheeks and the occiput densely white dusted, centre of occiput above brownish-black; antennae and palpi orange-yellow, slightly white dusted; arista fuscous. Thorax fuscous, dorsum distinctly shining, slightly brownish-grey dusted and with three rather evident brown vittae; pleura densely greyish-white dusted, and white haired. Abdomen brown, slightly shining, apices of tergites yellowish, and grey dusted. Legs testaceous yellow, coxae greyish, fore pair white dusted, all pale haired; all femora broadly fuscous on middle, grey dusted, and mostly pale haired, fore and hind tibiae slightly browned centrally, all tarsi with all of fourth and fifth segments, and apex of third, fuscous. Wings clear, veins pale, yellow at bases. Halteres pale yellow.

Frons at vertex more than half the head width and almost twice as wide there as at anterior margin, triangle extending well beyond middle of frons, evanescent anteriorly. All bristles rather short and weak; eye about as long as high, diagonally placed; cheek pale haired, one-third of the eye height; vibrissae short and fine, yellow; third antennal segment orbicular; arista swollen at extreme base, from there to apex filiform, practically bare. Thorax with the bristles as in genus, but rather weak. Hind tibial spur short and straight, pale coloured; basal segment of all tarsi more than half as long as tibiae. Penultimate section of fourth vein about one and a half times as long as ultimate section of fifth.

Length, 4 mm.

Type, Macknade, Qld., 1918.



Family Lonchaeidae.

This family is quite generally recognized by systematists now, but a few years ago it was considered as a subfamily of Sapromyzidae. In my opinion there are no structural similarities in the two groups that justify their being placed in one family, as such concepts are entertained today in the Acalypratae. In fact there are evidences of a closer approach to the Ortalidae than to the Sapromyzidae in certain structures of Lonchaeidae. At this time, however, we are primarily interested in discovering what species occur in Australia and not so much in solving the matter of group affinities.

Until recently *Lonchaea* Fallen was the only genus accepted by systematists, with *Earomyia* Zetterstedt, *Dasyops* Rondani, and *Teremyia* Macquart considered as synonyms. A few years ago Bezzi undertook some work on African and Oriental forms, and in 1920 he erected two new subgenera, *Lamprolonchaea* and *Carpolonchaea*. There is also another named segregate, *Acucula* Townsend, erected as a genus for the reception of *saltans* Townsend, a Peruvian species.

Bezzi attempted to link up certain structural characters of the adults with the food habits of the larvae in distinguishing the subgenera. *Lonchaea* he defined as containing "saprophagous species living in decaying vegetable matter or in excrement, and those apparently parasitic on various parts of vegetables", the adults with "a bare or only microscopically pubescent arista, rather long antennae, which reach at least to the middle of face, and well developed chaetotaxy". *Dasyops* Rondani, he considered, contained "the gallmaking species" in which the adults "have a bare arista, very short antennae, not reaching middle of face, and an inflated head, with less developed chaetotaxy". The third group he considered in his first paper as containing "fruit inhabiting species, which have a more or less plumose arista (with the exception of *aurea*), very long antennae, reaching to or even extending below the mouth border, and a much developed chaetotaxy". He subsequently removed *aurea* from this third group on the basis of the bare arista.

With reference to the larval habits I have this to state: Bezzi cast doubt on the record of Perris of predaceous habits in the larvae of *Lonchaea*, stating that he had no real observations to offer. I have, however, on several occasions reared *L. polita* Say in North America and find that the larvae readily feed upon larvae and puparia of other species, and even their own. This species lives under bark. There are also two species known to me which belong to *Lonchaea* in the strict sense, which have been reared from heads of thistles, and from the nest of a wood-boring bee. Also I consider it highly probable that many species which normally feed in the larval stages in excreta or decaying vegetable matter will be found to infest over-ripe or injured fruits and vegetables. Thus I am of the opinion that a careful investigation of the larval habits under diverse conditions will prove that there is very little specialization, and that there is no invariable relation between the larval feeding habits and the structure of the adults. There is practically no distinction between feeding upon decaying fruits and upon over-ripe or injured fruits, and it is difficult to decide in some cases whether the injury in which the larvae are found was caused primarily by them or by another insect, or some other agency. We find in some families species which feed in the larval stages upon dead insects and upon those which are only injured, and occasionally they occur upon perfectly sound specimens.

A peculiar habit of the larvae of at least some of the species of this family is that of springing or leaping. I have found that this is accomplished by the larva

forming a circle while lying on its side, attaching the mouth hooks to the anal extremity, and on the exertion of muscular force releasing the hold, upon which the violent straightening of the body against the surface propels the larva through the air many times its own length, at times as far as four or five inches. I found also that this springing could be induced by placing the larva upon a dry surface, and that so long as the surface remained dry the specimen exhibited exceptional muscular reactions, either springing or rolling over. My interpretation of this reaction was that the dry surface being unsuitable to the larva, causing a rapid drying out of the tissues, active springing or violent motion was resorted to in order more rapidly to locate a more favourable and damp situation. This impression was strengthened by the actions of the larvae when they were placed upon a damp surface, as they uniformly resumed the normal crawling motions of related forms. I have found that there is a similar reaction produced in larvae of many Cecidomyiidae under the same circumstances, but in the latter there is a structure, known sometimes as the "breast-bone", which is utilized in propulsion.

Below I present a synopsis of the Australian species of *Lonchaea*, sens. lat., available to me, and records of the occurrence of the species.

Key to the species of Lonchaea.

1. Frons with large irregular pits on practically the entire surface; face with a broad central carina which is slightly sulcate above, and on each side with a distinct antennal fovea; arista bare; bright metallic green species; legs black, basal segment of all tarsi except the tip yellow *rugosifrons* Bezzi
 Frons entirely without large pits, sometimes with minute punctures 2
2. Face with a broad well developed central carina which is distinctly sulcate in centre above, and on each side with a broad antennal fovea; arista bare; antennae not extending to mouth margin, third segment about two and a half times as long as wide; in colour similar to *rugosifrons* *avea* Macquart
 Face almost flat, at least without well defined antennal fovea; antennae extending to, or below, mouth margin, third segment more than three times as long as wide; colour black, with or without a blue tinge; tarsi black or brownish 3
3. Squamae white or yellow, the fringes pale 4
 Squamae brown or fuscous, the fringes dark 7
4. Arista with short pubescence, the longest hairs not nearly as long as its basal diameter; species with a distinct blue tinge, especially on abdomen
 *choreoides* Bezzi
 Arista with short hairs, the longest about half as long as width of third antennal segment 5
5. Tarsi with at least the basal segment yellowish-brown, and quite evidently paler than tibiae; female ovipositor much broader than usual, distinctly wider than third antennal segment except at apex; scutellum bare, or with at most one or two microscopic hairs in addition to the usual four bristles; fifth tergite of abdomen of male not excised at apex *hilli*, n. sp.
 Tarsi black, not paler than tibiae; female ovipositor slender, not as wide as third antennal segment on an apical section as long as that segment; scutellum with some hairs on sides and at apex, in addition to the four bristles 6
6. Fifth tergite of male abdomen elongate, more than twice as long as fourth, tapered to apex, and with a deep central notch at tip, the lateral apical prominences more densely setulose than usual *excisa* Kertész
 Fifth abdominal tergite of male abdomen broad, not more than twice as long as fourth and without any central notch at tip; usually in the same sex there is a long yellow hair-like penis projecting straight backward beyond apex of abdomen *filifera* Bezzi
7. Scutellum, when viewed from behind, with quite dense brownish dusting; hind femur with a series of anteroventral bristles, most of those on apical half about as long as diameter of femur; scutellum with many setulose hairs apically
 *citricola* Bezzi
 Scutellum, when seen from behind, without any dusting; hind femur without well developed anteroventral bristles; scutellum with few hairs apically 8

8. One of the bristles in the series along lower margin of cheek at least twice as long as any of the others species 1
 None of the bristles in the series along lower margin of cheek conspicuously elongated species 2

LONCHAEA RUGOSIFRONS Bezzi.

This species is readily distinguished from its allies by the coarsely pitted frons. There is a North American species, *vibrissata* Malloch, which has the frons similarly pitted, but it has a strong outstanding genal bristle, and is black in colour.

Described from New South Wales, South Australia, and Victoria. I have it from Como, N.S.W., swept from flowers (H. Petersen).

LONCHAEA AUREA Macquart.

Bezzi records this widely distributed species from Eidsvold, Qld.; I have it from Townsville, Qld.

LONCHAEA CHOREOIDES Bezzi.

Originally described from Sydney, N.S.W.; I have two males from Como, N.S.W., swept from flowers (H. Petersen). These specimens were in the same lot in which I discovered the type specimen of *Pachyneres australis* Malloch.

LONCHAEA HILLI, n. sp.

Male and female.—Glossy black, with a pronounced blue tinge on dorsum of thorax and abdomen, most pronounced in the female. Frons shining black, upper orbits blue-black, glossy; antennae and palpi black. Legs black, tarsi brownish, the basal segment palest, but not conspicuously so. Wings hyaline, veins brown, paler basally. Squamae and their entire fringes yellowish-white. Knobs of halteres black.

Frons of male at vertex about twice as wide as third antennal segment, a little narrowed anteriorly, inner vertical, ocellar, and the pair of orbital bristles rather long, outer vertical pair shorter than inner; surface with rather sparse hairs, those on central front portion longest; lunule haired; frons of female about one-third broader than that of male; antennae extending a little below mouth margin, third segment about three and a half times as long as wide; longest hairs on arista about half as long as wide; cheek not higher than width of third antennal segment, with rather short even marginal hairs. Thorax with two pairs of postsutural dorsocentrals, one pair of prescutellar acrostichals, no hairs adjacent to stigmatal bristle, the pteropleura bare, and the scutellum slightly dusted on disc, but with no fine hairs. Hypopygium of male small, fifth tergite tapered to apex, without an apical notch; ovipositor of female fully as wide as third antennal segment, flat, and rather abruptly pointed and bare at apex. Apices of auxiliary and first veins very close together; first posterior cell slightly widened at apex; inner cross-vein a little proximad of middle of discal cell.

Length, 3 mm.

Type, female, and allotype, Darwin, N.A., taken *in copula* (G. F. Hill).

LONCHAEA EXCISA Kertész.

I have before me one male of this species from Brisbane, Qld. (Dr. Turner).

The species is readily distinguished by the long, rather slender, tapered, and excised apical abdominal segment in the male sex. It occurs throughout the Malay Archipelago, but has not heretofore been recorded from Australia.

LONCHAEA FILIFERA Bezzi.

I identify as this species a number of specimens which are glossy black in colour, with yellowish squamae and fringes, slightly grey dusted scutellum, and in which the males have a long slender hair-like yellow penis which is usually exerted beyond apex of abdomen, often almost as far as the length of last tergite.

The species was originally described from the Philippine Islands and has not been recorded from elsewhere up to the present time.

I have a number of specimens from Cairns, N. Qld., and one pair from Palm Island, Qld. (F. H. Taylor).

LONCHAEA species 1 and 2.

I believe one or other of these species was listed as *citricola* Bezzi by Bezzi, but neither in my opinion may be identified with the Philippine species. I hope to revert to this matter later.

LONCHAEA CITRICOLA Bezzi.

I have before me two specimens from the Federated Malay States which I think belong to this species, but have none from Australia which correspond with them.

Family Sepsidae.

I have recently received a paper by Dr. O. Duda in which he presents a monographic study of this family. This paper bears on the front page the date 1925, and on page 153 the notation "Erschienen Dezember 1925". The actual date of publication is of importance, as my paper dealing with the Australian Sepsidae appeared on the fifteenth of the same month, 1925 (These PROCEEDINGS, p. 311), and the decision as to the priority of *Australosepsis* Malloch and *Sattelliseps* Duda depends upon the day of issue apparently, though the dates of publication appearing upon many continental European magazines since 1914 are notoriously unreliable.

In connection with Duda's paper it may be pertinent to note that the genus *Formicosepsis* de Meijere does not belong to Sepsidae.

Genus LASIONEMOPODA Duda.

In my paper above referred to, I suggested the possibility of segregating *Sepsis hirsuta* de Meijere from the others contained in my concept of *Sepsis*. My suggestion was that the species might be considered as a distinct subgenus, but Duda has gone farther than this and erected the above genus with *hirsuta* as genotype and sole species.

The characters of the genus are as listed in my paper, the haired frons being the outstanding feature mentioned by Duda.

Genus AUSTRALOSEPSIS Malloch.

As already indicated there is some question as to whether this name has priority over *Sattelliseps* Duda.

AUSTRALOSEPSIS FULVESCENS Malloch.

This species is apparently close to, possibly even the same as, *niveipennis* Becker var. *robusta* Duda described briefly in the paper by Duda above referred to. Typical *niveipennis* occurs in Africa and South-Eastern Asia, variety *robusta*

in Formosa. Only a comparison of material from the different regions will determine the status of the species, though a wide distribution is to be expected in species which are scavengers in the larval stages as this undoubtedly is.

Genus *PODANEMA* nov.

This genus belongs to Duda's group *Nemopodinae* which latter, despite the evident intent of Duda as indicated by the name, is not entitled to consideration as a subfamily.

The new genus is distinguished from related forms in Duda's paper by the projecting lower margin of face, a quite exceptional character in *Sepsidae*, the presence of one pair of orbital bristles, the short stout ocellars, postverticals, and inner verticals. The outer verticals listed as "Po" by Duda are lacking. In most characters the genus resembles *Nemopoda* Robineau-Desvoidy, but the outer verticals are present in the latter. From *Pseudonemopoda* Duda it differs in having quite a strong pair of orbital bristles, and in some other characters.

Genotype, the following species.

PODANEMA ATRATA, n. sp.

Female.—Black, slightly shining. Frons slightly brownish in front, face and antennae brownish-yellow, with greyish dust. Thorax entirely and quite densely dusted, brown on mesonotum except the sides, the latter and pleura pale grey dusted. Abdomen more evidently shining than thorax, with grey dusting, the apex of first complete tergite with a broad fascia of silvery white dust, most conspicuous when seen from behind. Legs black, trochanters rufous. Wings hyaline, narrowly black along costa to apex of auxiliary vein. Halteres black.

Frons at posterior ocelli about one-half the head width, and about as wide as long, slightly narrowed to anterior margin, surface with some faint longitudinal striae, orbits with dense white pile along anterior portions; postvertical bristles longer than any of the others, the verticals, ocellars, and orbitals, about equal in length; face slightly produced from upper to lower margin, with a depression on each side in which the antennae lie; vibrissal angle with two bristles and some much shorter hairs; third antennal segment about four times as long as second, tapered to apex; arista not much longer than antenna, bare; palpi very small but evident, with one or two apical hairs. Thorax with the following bristles: one humeral, two noto-pleurals, one supra-alar, one post-alar, one pair of dorsocentrals, one mesopleural, and two scutellars; the dorsal hairs almost indistinguishable. Tergites without outstanding bristles. Legs slender, fore coxae with a few apical bristles; prosternum with fine hairs; fore femur with a rather closely placed series of short spines on apical half of anteroventral and posteroventral surfaces, and no processes; fore tibia slightly thickened apically; fore tarsus broadened from before apex of basal segment to tip of fifth; mid femur with a depression near middle above; mid tibia with one or two posterodorsal and about seven posterior bristles, all short; hind femur with a number of bristles along anterodorsal surface; hind tibia with three or four very short anterodorsal bristles. Fourth vein bent down basally so that the basal cell is wider than discal for some distance at base of latter; first posterior cell not twice as wide at apex as at base, owing to the forward slope of apical section of fourth vein; sixth vein not extending to margin of wing.

Length, 5-6 mm.

Type and two paratypes, Townsville, Qld. (F. H. Taylor).

The genus is distinguished from *Sepsis* by the presence of but one pair of dorsocentral bristles, and a mesopleural bristle. To this genus also belongs *viduata* Thomson, but it has no dark basal streak on costa, and the bristles are shorter on thorax and head, the humeral almost indistinguishable, and ocellars minute.

Family Piophilidae.

I have previously recorded the genus *Piophila* Fallen, with two species, as occurring in Australia. Below I am adding a new genus of the family.

Genus CHAETOPHILOPHILA nov.

This genus has the same wing venation as *Piophila*, the costa and first vein being fused from just beyond apex of the auxiliary vein and presenting the appearance of a thickened costal vein which gradually tapers apically, the inner cross-vein is unusually short, and the sixth vein is obsolete at apex. The frons has a pair of quite prominent setulose hairs, or fine bristles, near anterior margin which are about equally distant from each other and eyes, and there are two orbitals on each side, the anterior one very short. Thorax with 1 + 3 pairs of fine dorsocentrals, one pair of long prescutellar acrostichals, two bristles on each humerus, one incurved, the other backwardly curved, and the presutural bristle large; mesopleura haired, without bristles; sternopleura with one bristle. Ovipositor chitinous, lancet-like.

Genotype, the following species.

CHAETOPHILOPHILA HYALIPENNIS, n. sp.

Female.—Fulvous testaceous, shining. A large mark over ocellar region and a subtriangular mark at each upper angle of frons which extends down on occiput, black; third antennal segment and arista, and palpi, except their bases, black. Dorsum of thorax in type specimen with broad fuscous suffusion, indistinctly vittate, possibly in some specimens distinctly vittate. Abdomen brown, paler at base. Legs fulvous testaceous, the femora darkened. Wings hyaline. Halteres yellow.

Frons at vertex fully one-half the head width, narrowed in front, all vertical bristles and the ocellar pair long, the postverticals distinctly divergent, ocellars a little behind level of anterior ocellus; antennae short and broad; frons slightly projecting in profile; face slightly receding below; cheek at posterior margin about as high as eye, the latter a little longer than high; vibrissae long. Thorax with long dorsal hairs which are almost as long as anterior dorsocentrals; disc of scutellum haired, basal bristles about half as long as the long apical pair. Legs normal, no preapical bristle evident on tibiae. Wings rather narrow, inner cross-vein close to middle of discal cell.

Length 2 mm.

Type, Sydney, N.S.W., 14.4.1925.

The genus *Mycetaulus* Loew is not known to occur in Australia. It has only two pairs of dorsocentral bristles, and lacks the pair of long setulae on anterior margin of frons. The genotype has also but one humeral bristle, which is backwardly directed, and the acrostichals and discal scutellar hairs are lacking.